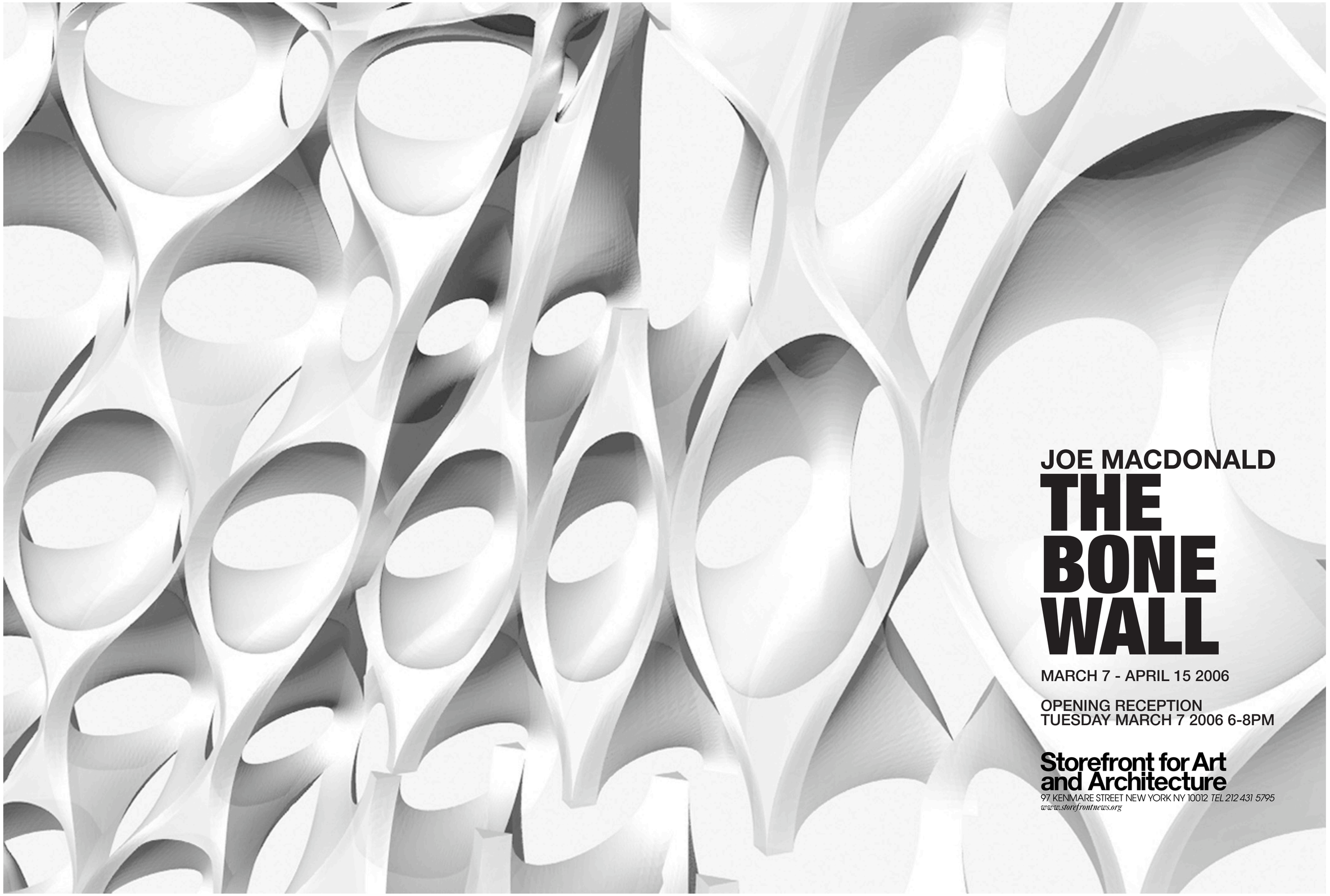

JOE MACDONALD
THE BONE WALL

MARCH 7 - APRIL 15 2006

OPENING RECEPTION
TUESDAY MARCH 7 2006 6-8PM

Storefront for Art and Architecture
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JOE MACDONALD / URBAN A&O ARCHITECTURE LLC

STRUCTURED ORNAMENT: THE BONE WALL
Implicit Trigonometric Patterns: An Architectural Wall Screen Prototype

ON PATTERN

What constitutes a pattern?

Geometric uniformity? Behavioral repetition? Visual recognition?

What happens when we move to higher orders of complexity in physical organizations to include emerging developments in computational recursion and parametric modeling? Continuity and connectedness, two indicators of topological form, are intrinsic to nearly all digitally generated patterns.

Simply put, pattern *is* technological.

Logics of pattern making also break into the third dimension, from composite textile fabrication to skeletal framing assemblies where terms such as tiling, nesting, and tessellation are used to describe the particular parameters and operative rules of their formation. Parametric design processes begin by defining meaningful parameters and control limits. Iterative feedback loops in programming, master geometries, and built-in evaluative criteria allow for indexical control points and formal and material optimization, requiring a fully participatory role of the system's designer.

What then, are the technological implications of a pattern's *cell* generation and its *repeat* formulation —a network of *smart* relationships— as they relate to the production of architectural morphologies? Through parametric modeling and physical prototyping at a variety of scales, various potentials for the creation of new forms in architecture can be explored. The logics of pattern can be integrated at multiple design thresholds: in initial creative concept models, in generative spatial armatures, and in contemporary CAD/CAM fabrication techniques.

"when several coexist… the whole set will tend to form a meshwork of hierarchies, articulated mostly through local and temporary links."
--Manuel de Landa, A Thousand Years of Nonlinear History, 1999

2D/2.5D/3D

Within the *site* of pattern making, what is the relationship between surface and depth?

The BONE WALL explores this contemporary question.

Preoccupations about the seemingly limitless effects of a building's 'skin' as a material artifact in current architectural practice have relegated this surface as a primary domain of creative interest and oftentimes singular focus of the architect. It has become an ever increasingly *thin* site of performance. As a result, this emphasis on surface has arrested our understanding of space at the building envelope, and pattern, for all intensive purposes, remains an extrinsic and two-dimensional application.

As a counterargument to this trend, the BONE WALL aims to demonstrate through geometry, structure, materiality, and spatial configuration that pattern is in fact multi-dimensional, intrinsic, programmatic, and capable of occupying complex spatial geometries and substantially deep space.

DESIGN METHODOLOGY

Inspired by the work of Austrian-born sculptor Erwin Hauer, the ambition of this experiment was continuity of surface and modulation of light within the wall, in addition to providing programmatic elements including storage and seating. The design of the BONE WALL began with parametric modeling of a base "cell", or rather, ½-cell, which was then inverted and rotated to combine into a complete cellular unit. The base cell has six triangular "horns", 3 up and 3 down, a total of 18 corners, or "control points". Through iterative manipulations of these control points along the wall's organizing horizontal splines as configured in CATIA, the body of the wall and its cellular web-like structure stretches and undulates. Any change made to the geometry of the splines regenerates the shape of each cell, demonstrating both a non-linear and reciprocal relationship between software and designer that is intrinsic to parametric —or parameter-based— modeling.

Using CATIA's "product-file" structure and "part-file" (the cells) in-context modeling, geometric dependencies were established whereby modifications to the form of the wall would propagate down CATIA's hierarchical tree, updating affected cell geometries along the way. A total of 72 cells combine to comprise the wall —or 2,592 control points— all parametrically linked: all points "know" the relative location of one another at any time in the design process.

FABRICATION AND ASSEMBLY

The cells were fabricated on a 5-axis CNC milling machine in high density foam. Upon close inspection the router's tool path can be seen on the surface of the BONE WALL. It is not entirely smooth to the touch. The milling machine was set on a 1/32" step-over, resulting in a topographic plan-like finish. The cells were then joined together by hand with adhesive, and the final wall was painted following assembly.

The BONE WALL in its use of parametric modeling serves as an experiment aimed toward advancing contemporary architectural practice. Parametric modeling environments shape new cognitive ambiances within which design procedure is conceived. The BONE WALL demonstrates a new opportunity for designers to participate more directly in processes of fabrication. In our contemporary architectural context, a resuscitated debate over the role of ornament is unfolding; the BONE WALL strives to demonstrate ornament's intrinsic necessity over extrinsic contingency.

RELATED EVENTS

On Pattern exhibit. Faculty Currents Wall, Harvard Graduate School of Design.
February—March, 2006.

GSD *Critical Digital* Roundtable: "Digital Ornament", Harvard Graduate School of Design.
April, 2006.
See CRITICAL DIGITAL: [http://projects.gsd.harvard.edu/critical/] for event details.
"Critical Digital fosters a dialogue about digital media, digital technology and design. Challenging contemporary discourse of digitality through symposiums, competitions, publications and conferences, the intention of Critical Digital is to offer a forum of critique of current trends and inquiry within contemporary digital culture."

A conversation with Erwin Hauer, 18th Annual International Contemporary Furniture Fair (ICFF), May 20-23, 2006, Jacob K. Javits Convention Center. Sponsored by Metropolis magazine. See [www.icff.com] and [www.metropolismag.com] for event details.

PROJECT CREDITS

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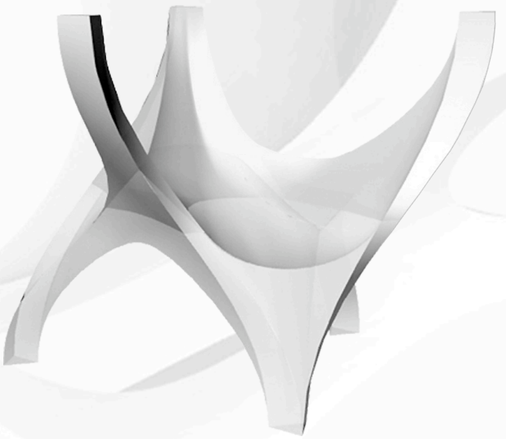

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Gallery hours are Tuesday–Saturday, 11:00am – 6:00pm.
The gallery is located at 97 Kenmare Street, between Mulberry and Lafayette Street (trains: 6 at Spring or N/R at Prince).
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